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Aflatoxin B1 albumin adduct levels and cellular immune status in Ghanaians

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Abstract

Although aflatoxins (AFs) have been shown to be immune-suppressive agents in animals, the potential role of AFs in modifying the distribution and function of leukocyte subsets in humans has never been assessed. We examined the cellular immune status of 64 Ghanaians in relation to levels of aflatoxin B1 (AFB1)-albumin adducts in plasma. The percentages of leukocyte immunophenotypes in peripheral blood, CD4+ T cell proliferative response, CD4+ T(h) and CD8+ T cell cytokine profiles and monocyte phagocytic activity were measured using flow cytometry. NK cell cytotoxic function was determined by perforin and tumor necrosis factor-alpha expression in CD3-CD56+ NK cells. AFB1-albumin adducts levels ranged from 0.3325 to 2.2703 (mean = 0.9972 +/- 0.40, median = 0.9068) pmol mg(-1) albumin. Study participants with high AFB1 levels had significantly lower percentages of CD3+ and CD19+ cells that showed the CD69+ activation marker (CD3+CD69+ and CD19+CD69+) than participants with low AFB1 levels (P = 0.002 for both). Also, the percentages of CD8+ T cells that contained perforin or both perforin and granzyme A were significantly lower in participants with high AFB1 levels compared with those with low AFB1 (P = 0.012 for both). Low levels of CD3+CD69+ (r = -0.32, P = 0.016) and CD19+CD69+ (r = -0.334, P = 0.010) cells were significantly associated with high AFB1 levels using correlation analysis. By multivariate analysis, there were strong negative correlations between the percentages of these cells (CD3+CD69+: b = -0.574, P = 0.001, and CD19+CD69+: b = -0.330, P = 0.032) and AFB1 levels. These alterations in immunological parameters in participants with high AFB1 levels could result in impairments in cellular immunity that could decrease host resistance to infections.

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